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AN
ESSAY
ON
Primitive, Latent and Regenerated
LIGHT.

By Dr. JOSEPH B. LADD.

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An ESSAY

On Permanent, Latent, and Regenerated LIGHT.

In which it is attempted, upon original principles, to account for every luminous phenomenon — the light of flame, the phosphoric glow, and the ſparkling of the blue ocean.

LIGHT is an element with which every one bleſt with the faculty of ſeeing is ſo well acquainted, that to them it needs no deſcription — to ſuch as are unfortunately ſightleſs, it will admit of none. The other organs of ſenſe convey no ſimilar perceptions to the mind, from which, by analogy of ſenſation, the unhappy blind man may obtain its moſt diſtant idea: and, however the world may have been deluded by fictitious narrative, it is a certain truth, that blind men cannot diſtinguiſh the complexion of bodies by the moſt delicate touch*. To a perſon born blind, [illegible] idea of viſible forms is abſ[illegible] and ſuch a perſon, by [illegible] handling any body, can [illegible] what ſhape it appears [illegible] man, by taſting [illegible] gunpowder, can deſcribe the ſound of a cannon.

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BRITISH MUSEUM

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[*] Several inſtances are on record, of perſons who have pretended to diſtinguiſh colours by feeling only.

Had you aſked the moſt ignorant blockhead of antiquity, What is light? he would have reſolved you in a moment, and would doubtleſs have pitied the weakneſs which gave birth to ſo ſilly a queſtion. Before I became a philoſopher (might you reply) I was, Sir, as knowing as yourſelf; but alas! the more I learn the leſs I know. The philoſopher, all diffident, attempts the gordian web, and finding no clue, he becomes puzzled; he ſits down confounded, and laments his feeble abilities. The child of ignorance advances, reſolved to ſurmount all difficulties; he ſevers the knot with a blow, looks around him with ſatisfaction, and exults with ſeeming conſciouſneſs of a ſuperior wiſdom.

Alas! the knot is ſtill untied, the *firſt powers* remain yet unexplored, and the intelligence of man is all too feeble for the great inveſtigation.

"The ways of Heaven are dark and intricate,
"Puzzled with mazes, and perplex'd with wilds;
"Our underſtanding traces them in vain!
"Nor ſees with how much art the windings run,
"Nor where the regular confuſion ends."

ADDISON.

"*Let there be light*," was the fiat of JEHOVAH ALEIM at the creation. "*Let there be light, and light there was*," ſays the ſublime hiſtorian. From this moment all things ſhone by this reflected element, which gave viſibility of form and variety of complexion to the whole created univerſe. Still light was but very little known. The doctrine of colours, of phoſphori, and indeed the whole philoſophy of viſion, remained for ſome thouſands of years unnoticed. At length *Newton* aroſe; that ſuperior intelligence! formed to explore nature in every explorable path: he gave us a theory of viſion, and taught us the doctrine of colours. He was the firſt of mortals who attempted to divide light, the infinitely ſubtle light; and, ſtrange truth! by a mechanical ſeparation, he diſcovered and demonſtrated its conſtituent parts.

There are two general propoſitions which in the courſe of this Eſſay we ſhall endeavour to prove, and on the ſtrength of the probable evidence brought in their favour, all the ſubſequent doctrine will depend.

1ſt. *That light is an elementary principle, entering and uniting with moſt bodies by ſimple attraction, or the affinity of compoſition, and capable of being regenerated by decompoſition.*

2d. *That all light, wherever found, however produced, is eſſentially the ſame, and is always originally ſolar, or derived from the ſun.*

Light is denied to be an element by ſome, becauſe it is diviſible by the priſm, into parts that are not ſimilar. But by this reaſoning, we ſhall quickly deſtroy the arrangement of our elementary principles. The more refined chemiſtry has taught us that the element of air is not a ſimple homogeneous principle, but a fluid compoſed of diſſimilar parts. The element of earth too has been found diviſible into ſix different kinds, which have never yet been decompounded into more ſimple, nor changed into one another †. Are there then ſix elements of earth? I anſwer, that all earths may be reduced to the firſt principle of acid coagulated by water; and by that reaſoning, earth can be no element at all. Let us not diſpute about words. If among the Ariſtotelic principles, air, earth, fire, and water, the two former are admitted as elements, the important principle of light has a claim founded in equal propriety, and ought by no means to be rejected.

Here then I adopt my grand propoſiton, *Light is a real elementary principle, which pervades, is blended with, and becomes a conſtituent part of almoſt all viſible ſubſtance.* By the ſubtility of parts, the impetus of its rays, and the abſorption of bodies, it enters the compoſition of animals, of vegetables, and of ſubſtances unorganized; and becomes the only inflammable principle in them all. This inflammable principle muſt not be confounded with heat or with fire. Bodies which contain neither of theſe, may contain light in the greateſt abundance: for inſtance, nitre, the coldeſt and moſt inflammable ſubſtance in all nature. Light will paſs through many bodies without remaining in them; as glaſs, ſhallow water, and all tranſparent ſubſtances. By the impetus of its rays, it enters many bodies without mixing, and paſſes off without decompoſing them, as we may inſtance in wood, in ſtones, in earth, in luminous phoſphori, and in ocean water: but wherever it comes into contact with any ſubſtance to which it is attracted, and with which it has a peculiar affinity, it then forms a cloſe union, becomes a component part, and can never again be ſeparated, without a decompoſition of the whole.

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† 1ſt, The earth of the ponderous ſpar; 2d, calcareous earth; 3d, magneſia; 4th, clay; 5th, ſilicious earth; and, 6th, earth of gems. Theſe earths, by Profeſſor Bergmen, are ſtiled *Earths Primitive.*

When certain ſubſtances are decompoſed by fire, the light which they contained reſumes its elaſticity, and paſſes off in its original form. Such ſubſtances are ſaid to flame; and this property is termed inflammability, or the principle of combuſtion.

Inflammability then, wherever we meet with it, is nothing more than ſolar light become latent by its union with terrene ſubſtances. It enters the earth, unites with its proper acid, and forms nitre; combined with a portion of phlegm, it conſtitutes the fat of animals; and we trace its exiſtence through the vegetable kingdom in ſpirit and in oil: both of theſe are equally inflammable, and the only diſtinction is, that the eſſential oil of vegetables appears to be like animal oil, a compoſition of *latent light* and of groſs phlegm intimately united, while the more ſubtle ſpirit is conſtituted of *light* and *aërial acid.*

The powerful action of light on, and intimate union with, the animal, vegetable, and mineral kingdoms, may appear chimerical to ſuch as do not obſerve that daily experience is a daily demonſtration of this fact. This demonſtration is moſt ſtrikingly remarkable in the vegetable kingdom. It is well known that moſt plants ſleep in the night ſeaſon, *i. e.* their leaves droop and their flowers ſhut up. This, together with that remarkable property termed vegetable inſtinct, has been proved ‡ to depend on the privation of light. The vegetable green too, is cauſed not by a ſimple reflection of light from, but its intimate union with, the vegetable compoſition. All this is deducible from experiment. Let the ſeed of any plant be ſcattered in darkneſs, on earth deſtitute of nitre; let no light ever approach it; when the plant has acquired its full growth, examine it and you will find it white, watery, ſubacid, and uninflammable: it will appear ſlender, and its leaves will droop as if in a ſtate of perpetual repoſe. Analize it and you will obtain water, ſalt, phlegm, and a little acid, but neither oil nor ſpirit. Another plant of the ſame ſpecies, by being barely expoſed to the light, will grow ſtrait, vigorous, appear of a lively green, yield both oil and ſpirit, and be highly inflammable.

Solar light and artificial *light* or *flame* appear then to be eſſentially the ſame principle. Let us illuſtrate this by a familiar example: A certain piece of ground, we will ſuppoſe, abſorbs the luminous rays in great abundance If the ground be ſandy, if it contain not that ſalt or acid with which light has ſo cloſe an affinity, the rays will ſuffer no detention, but paſs off unaltered. If, on the contrary, the earth abounds with the proper principle, the abſorbed light will cloſely unite with it, and form inflammable *nitre*. This nitre may then be chemically extracted and decompoſed by means of heat; and at the inſtant of this decompoſition, the concentrated light will ruſh forth, reſume its elaſticity, and paſs off in a flaſh. This ſeems to be the moſt ſimple ſtate of union between ſolar light and terrene ſubſtance.

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‡ See "The ſleep of plants conſidered," by Dr. Hill; and the experiments of the ingenious M. Ingenhouſz.

In ſuch land as this, rich with the accumulated ſtore, which we muſt no longer call light, the induſtrious farmer ſows his corn. In tracing the proceſs of vegetation from the early germe to the plant at maturity, we obſerve, that the corn acquires its growth and vigour from the nitrous earth at its root, and the light which it abſorbs and aſſimilates into its ſubſtance above. Hence it becomes replete with thoſe grand principles of nutrition, oil and ſugar. It is devoured in this ſtate by the lowing ſteer. The eſſential oil and the ſaccharine ſpirit enter the animal compoſition, and become fat; from whence tallow is formed. If this tallow be moulded into candles, and the wick of one of them be held in the neighbourhood of fire, the particles of the candle will be decompoſed by the heat, and the hitherto latent concentrated light, as it becomes elaſtic, will fly off with its original appearance. This phenomenon will continue till the decompoſition has wholly taken place; or, in other words, till the candle is burnt out.

Hence the flame of a candle, and every other luminous flame, though conſidered by the vulgar as a different ſpecies of light, will, to the philoſopher who has traced the varying proceſs, appear to be what it really is, abſolute REGENERATED SUNSHINE.

We have now proved, as far as the propoſition is capable of proof, that light is an elementary principle, which enters the compoſition of almoſt all compounded ſubſtance. We have ſhewn in what manner ſuch ſubſtance is ſaid to flame, when bodies, by the preſence of heat, ſuffer a decompoſition of parts, and the latent light becomes again viſible. We ſhall now enter on our ſecond propoſition, *that all light is eſſentially the ſame, and is always in its original ſtate, ſolar or derived from the ſun.*

So much of this propoſition as reſpects combuſtible matter has, we truſt, been already proved: but as many ſubſtances, viz. the luminous phoſphori are found to emit light, although they poſſeſs no inflammability; it remains that we demonſtrate how thoſe ſubſtances become luminous by means of the ſolar ray.

The rays of light are propelled from the ſun in lines phyſically ſtrait; and they poſſeſs the greateſt velocity * of any material principle known, flying nearly thirteen millions of miles in a minute Whether this velocity depends on the inherent energy of the ſun, or is cauſed by a mutual repellency of the luminous particles, may here be queſtioned. I adopt the latter opinion, becauſe it appears the moſt probable. This mutual repellency may be demonſtrated, and of itſelf is all-ſufficient to account for the velocity of light.

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* *Although the element of ſolar light poſſeſſes the leaſt perceptible weight, yet the amazing velocity of* 13,000000 *of miles in a minute, muſt give it a momentum capable of driving through the hardeſt bodies, and penetrating the fartheſt receſſes of the earth, did the pores run in ſtrait lines.*

If an hundred large candles were lighted in a room ten feet ſquare, they would fill it with denſe rays, which would cauſe a ſtrong reflection from the ſurrounding walls: in this caſe the room is full of light. As there are a thouſand cubic feet to be illuminated, the light of each candle muſt be ſuppoſed to illuminate a ſphere of only ten cubic feet in diameter. But if you remove ninety-nine of the candles, the remaining one will now occupy a thouſand cubic feet, and the room will be ſtill full of light. Nay, if you expoſe the ſame candle to the open air, its light will be ſeen at two miles diſtance. So that the ſame light which was compreſſed within the ſpace of ten cubic feet, is now, by the mutual repulſion of its particles, diffuſed into a ſphere of four miles diameter †: and this it ſo completely fills, that you cannot place a pin's head any where in that ſphere without receiving ſome particles of light.

Hence we take it as demonſtrated, that the particles of light are poſſeſſed of mutual repulſion, by which they are always endeavouring to extend themſelves every way. This point eſtabliſhed, we ſhall obſerve, that the luminous phoſphori, which we are now conſidering, almoſt univerſally emit their light without ſuffering a decompoſition of parts, and only in the abſence of the ſolar ray. Several of them, as the Bolonian ſtone, have been long ſuſpected of abſorbing the ſun's rays, and emitting them in darkneſs. But the cauſe of this phenomenon has never been ſatisfactorily inveſtigated by any author that I have met with.

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† *See Dr. Newentyit. Relig. Philoſopher.*

You will find under propoſition the firſt, that there are ſome bodies which receive and tranſmit the radiant light: it paſſes through them with eaſe, and ſuffers no detention. This is owing to the large rectilineal pores of ſuch bodies. The ſwift-darting rays meet with little reſiſtance on their ſurfaces, and are conſequently but little reflected from them; but they are driven through their pores with the greateſt facility, and give to ſuch bodies the property of tranſparence; ſuch are glaſs, ſhallow water, &c.

There are other bodies equally capable of receiving light, but their pores not being rectilineal, they poſſeſs not the property of tranſmitting it. Now if ſuch bodies have no affinity with, or attraction for light, this element will not mix with them as we obſerved of inflammable ſubſtances; but remain impriſoned no longer than while the force which impelled it into their interſtices remains; or, in other words, while there is light on their ſurfaces.

To make this as familiar as poſſible, ſuppoſe the Bolonian ſtone introduced into a room full of denſe light: this light, by its mutual repellency, is endeavouring to extend *itſelf every way*; and a number of its particles are, by that repellency, forced into the vacuities of the ſtone; thoſe denſe rays which impelled theſe particles into the ſtone, now, by the ſame repellency continued, act as a preſſure on its ſurface, to prevent their eſcaping. But remove this preſſure, in other words, carry the ſtone into darkneſs, and you will find that the particles of light impriſoned in its interſtices being no longer repelled by denſe light on its ſurface, endeavour, by their own mutual repellency, to *extend themſelves every way*, and iſſue from all parts of the ſtone with the appearance of flame.

Hence two forces are to be conſidered as acting againſt each other; a *vis repellendi* of external light impelling certain luminous particles into the poroſities of the ſtone, and there detaining them, and a *vis elaſtica*[*] of the impriſoned particles endeavouring to recover their ſituation, and extend themſelves every way. Hence we eaſily conceive why phoſphoric bodies emit no light in the day time; becauſe the velocity of repulſion which drives the particles of light into their pores, ſtill detains them there by its continued action on their ſurfaces. We alſo conceive why they ſhine in the night ſeaſon; becauſe the repulſive force of external light being taken off from their ſurfaces, the impriſoned light *extends itſelf every way*, reſumes its elaſticity, and ruſhes forth with its original appearance.

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[*] *Theſe two forces depend on one principle, viz repulſion, and are in effect the ſame, diſtinguiſhed as above for the ſake of perſpicuity only.*

The above reaſoning will equally apply to all kinds of the luminous phoſphori †, and demonſtrates the ſecond general propoſition, that all light is eſſentially the ſame; that it is real ſunſhine, wherever met with, and differs only by variety of circumſtance.

I ſhall now make ſome miſcellaneous remarks, which may ſerve ſtill farther to elucidate what has been ſaid, and attempt, upon the principles eſtabliſhed, to account for ſeveral curious phenomena of light and colours.

Dr. Henry Moyes, a man of great ingenuity, and who deſerves the higheſt praiſe for his attempts to diſpenſe the *Soul illuminating Ray*, was himſelf unhappily ſightleſs. This misfortune led him into ſeveral erroneous notions reſpecting light. His catalogue of luminous phoſphori, contains ſeveral ſubſtances not at all phoſphoric. Snow may be mentioned as one of them. This ſubſtance does not, as the Doctor ſuppoſes, imbibe the ſun's rays by day, and emit them at night. It is certain, that ſnow is viſible at night, when other ſubſtances are not; but this ariſes only from the diſpoſition of its parts, which are ſuch, that not a ray is loſt on them. From its multitudinous points, it ſtrongly reflects the light in all directions, and reflects it when other bodies do not: hence, if there are any particles of light left in the horizon, though too few to give viſibility to common objects, they will be ſtrongly reflected by the ſnow.

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† *The electric flaſh is not here included, although it might be demonſtrated to be dependent on the ſame principles, would the bounds allotted to this eſſay permit. It ſhall be mentioned elſewhere.*

The Doctor had been informed that ſnow gave light in the night, and hence aroſe his miſtake. But had that ingenious man been bleſt with external viſion, he would doubtleſs have been more correct in his arrangement, and have made an important diſtinction between effluent light, and affluent light reflected.

Although ſhallow water be not at all phoſphoric, ocean water is highly ſo. But the ſparkling of the briny waves, muſt not be confounded with ocean-foam: this ſparkling is often obſerved in the ſmootheſt water, independent of the ſpray, and is really denſe effluent ſunſhine——while the viſibility of the white foam, like that of ſnow, ariſes from nothing more than its property of ſtrongly reflecting the affluent light.

COROLLARIES.

"Every white ray of light is diviſible by the priſm, into ſeven diſtinct ſmaller rays; of which the red, or flame-coloured ray is the ſtrongeſt——the others gradually diminiſh in ſtrength; and the violet, or blue-coloured ray, is the weakeſt of all."

NEWTON.

1. Light is the only inflammable principle of all bodies, and is what moſt writers mean by phlogiſton.

2. Light and heat are two oppoſite principles; and when they meet in bodies, they mutually expel each other.

3. Light and heat may, notwithſtanding, be united in bodies in a certain proportion, by means of a third principle; but when either of them predominate, a decompoſition will take place.

4. All light is ſunſhine.

5. Animal and vegetable oils are compoſed of light and phlym, with ſome heat.

6. Dephlegmated ſpirit of wine, is compoſed of ſunſhine and heat, fixed by aërial acid.

7. Dephlegmated ſpirit, contains the greateſt quantity of light and heat of any known ſubſtance.

8. Salt of Nitre poſſeſſes the greateſt quantity of latent light, with the ſtrongeſt attraction for heat, of any known ſubſtance.

9. All flame is regenerated ſunſhine.

10. The particles of light are mutually repellent.

QUERIES.

Q. 1. Why are vegetables green?

A. Becauſe by their attraction for light, they admit all the rays, except ſuch as are the weakeſt; and thoſe, viz. the blue and yellow, are reflected from their ſufaces, and occaſion their green colour.

Q. 2. Why is regenerated ſunſhine, or flame, uſually of a deeper red, than the ſimple effluent light of the ſun?

A. Becauſe all bodies into which light enters, as a component principle, receive the ſtronger rays of the ſun, and reflect the weaker: hence latent light contains a greater proportion of the flame-coloured rays, and muſt, when regenerated, appear of a deeper red.

Q. 3. Why do heated and burning bodies flame or glow?

A. Becauſe the heat expands, dilates, and decompoſes the burning ſubſtance, and expels the latent light.

Q. 4. Why does rotten wood ſhine at night?

A. Becauſe by putrefaction, a decompoſition of its parts takes place, and the light becomes regenerated by its own elaſticity.

Q. 5. Why do other putrefying ſubſtances, as fiſh, &c. ſhine at night?

A. From the ſame cauſe.

Q. 6. Why do not they ſhine by day?

A. Becauſe the ſtrength and velocity of the ſolar rays, act as a repulſive preſſure on the ſurfaces of ſuch bodies, and hinder the effluence of their latent light.

Q. 7. Why do they ſhine moſt in the darkeſt night?

A. Becauſe the leſs affluent light ſurrounds them, the leſs their latent light is preſſed upon or repelled, and the more copious and ſtrong is its ſeperation.

Q. 8. Why do not all putrefying ſubſtances ſhine?

A. Becauſe their latent light, inſtead of flying off, is powerfully attracted by ſome other principle, *e. g.* when vegetable and animal ſubſtances putrefy, the oil and ſpirit are not always decompoſed, but are ſometimes evaporated, and ſometimes unite with the acid of the earth, and form Nitre.

Q. 9. Why is ſhallow water tranſparent?

A. Becauſe its particles do not touch one another. * It conſequently poſſeſſes large pores, which in a ſtill time are rectilineal, or nearly ſo; and tranſmit the rays of light with facility.

Q. 10. Why is the water of the ocean blue?

A. Becauſe water, from its large vacuities, is eaſily pervaded by nearly all the rays of light; conſequently none are repelled from its ſurface, except the weaker or blue rays.

Q. 11. Why is ſea-water green?

A. From the united reflections of light from the bottom of the ſea, and the ſurface of the water. The blue rays are reflected from the ſurface. The yellow, next in ſtrength, penetrate to the bottom, and are there reflected, they paſs up through the water, unite with the blue rays, and form green.

Q. 12. Why is ſea-water ſometimes blue?

A. Becauſe from a conjunction of ſeveral cauſes, as the ruffling of winds; a greater ſaltneſs or compactneſs of the water; and a difference in the bed of the ſea, the reflection from the bottom becomes imperceptible.

Q. 13. Why is the foam of the ocean white?

A. The air which enters the pores of water, is by the agitation of the waves, more

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* This remarkable property of water ſhall be treated of in another place.

more and more intimately blended with it, whence the particles are divided and blown up, and the rarified maſs having no rectilineal pores, but containing the greateſt variety of poliſhed ſurface, reflects the rays of light from every point: and as in this caſe no particles are abſorbed, the whole rays are reflected, and the foam is conſequently white. †

Q. 14. Why does one light deaden the ſplendor of another?

A. From the repellency of the luminous particles.

Q. 15. Why does the effluent ſunſhine extinguiſh the light of flame in a wood fire?

A. This is anſwered under Queſtion 6 and 14. Becauſe the ſolar rays repel the regenerated light within the interſtices of the wood, as faſt as it is ſeparated by the decompoſition of heat: whence the effluent light cannot ruſh forth in ſtreams, but is collected around the burning ſubſtance, and by the repellency of heat, is driven off in a denſe glow.

Q. 16. Why does the ſun appear red through miſt?

A. Becauſe the weaker rays are reflected from the ſuperior ſurfaces of the collected miſt, cloud or vapour; and conſequently among theſe rays which penetrate through and reach us, the flame-coloured ray bears more than a uſual proportion.

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† This is the caſe with ice and ſnow. Thin glaſs is generally blue; thicker, or more compact glaſs, reflects more rays, and is green; but if the rectilineality of its pores is deſtroyed by pulverization, every kind of glaſs becomes white.

Q. 17. Why is the moon's radiance paler than that of the ſun?

A. Becauſe the ſtrong red rays penetrating the lunar ſurface, the weaker rays are principally reflected.[‡]

In the beautiful and ſublime fabric of the univerſe, not an atom is loſt.——Such is the Œconomy of nature!——Matter is ſtill varying itſelf under new forms, its eſſence ſtill unvaried. Flame, and all kinds of regenerated light, we know do not looſely adhere to terreous ſubſtance; but in the moment of their ſeparation, acquire a velocity upwards: and as the rays cannot be loſt, they are undoubtedly accumulated ſomewhere, moſt probably in the ſuperior atmoſpheric[§] regions

[‡] This almoſt entire abſence of the active red-ray, appears to be one reaſon why the moon-beams do not reflect heat, or in common language, why the light of the moon is cold.

[§] It may be here objected, that light cannot be accumulated in ſuperior regions of the atmoſphere; becauſe in that caſe, it would certainly be viſible, and the earth would be illuminated in the abſence, as well as in the preſence of the ſun. But it muſt be conſidered, that the velocity of ſuch light is determined upwards, as appears by the aſcent of flame. Now if this light gives no rays downward, to act on the optic nerve, it is inviſible or latent, to all intents. If light be not radiant, if it does not reach and penetrate the eye, it certainly cannot be ſeen, however great its accumulation; but if by any power acting on it above, it acquires a velocity downwards, it becomes viſible, by penetrating the eye, being refracted by the aqueous and chryſtaline humours, collected by the vitrous humour, and reflected from the Retina, regions; and here they are doubtleſs the occaſion of all lucid Meteors, Aurora Borealis, &c. &c.

Q. 18. Why may not the ſolar effluent rays, meeting with particles of rare light above the atmoſphere, drive them back by its repellency, giving them a velocity downwards, like true primitive ſunſhine? and if ſo,

Q. 19. Why may not the light this day regenerated from the fuel burnt in my chimney, aſcend to the ſuperior regions of the atmoſphere, appear to night in a thouſand meteors, and to-morrow, by the repellency of the ſolar rays, be driven once more to the earth, in the form of primitive ſunſhine?

Q. 20. Action and re-action being always ſuppoſed equal, why may not the effluent light of this earth exert an action ſimilar to the above mentioned, on the ſolar rays, viz. repelling them backward, and giving them a velocity downward to the ſun's ſurface? and if ſo.

Q. 21. Why may not the earth and the other planetary bodies become ſuns to the central ſtar of our ſyſtem? Why may they not occaſion light and heat in his body in the ſame manner as he is ſuppoſed to be the diſpenſer of both to the leſſer bodies which ſurround him?

But here we ſtop—in treading the path of curious inveſtigation, we have been led by an *Ariadne's clue*, far beyond the regions of demonſtration. We have paſſed the bounds allotted to mortals, and dared to propoſe ſome queries which none, perhaps, but diſembodied ſpirits can reſolve.—It is now time to retire, for while with humble hearts and eyes trembling to the foot of the throne, we endeavour to explore ſome out-line of adorable Omniſcience, we muſt not expect to inveſtigate the GREAT FIRST Cauſe, nor "*remove the veil which God has drawn around his incomprehenſible Majeſty.*"

Forbear raſh mortal!—'Tis an impious aim
Own God immediate acting through the frame;
'Tis HE omnipotent o'er all preſides:
HE, the firſt Cauſe, each operation guides;
Fear on his awful privacy to preſs;
But hon'ring him, thy ignorance confeſs.

ANONYMOUS.

This little eſſay is now completed. The author has not endeavoured to appear learned by lengthy quotations. It was his intention to be univerſally underſtood, as that is always the firſt ſtep to conviction. He has therefore written as eaſily as the ſubject would admit, and ſometimes has attempted demonſtration. He humbly hopes that he has, in ſome meaſure, ſucceeded in both. M. Macquer, it is true, has very ingeniouſly ſubſtituted light inſtead of the phlogiſton of ſtahl, but the author of this treatiſe believes his doctrine of regenerated light to be notwithſtanding, original. He has borrowed little from authors, and flatters himſelf, that on a ſubject ſo difficultly acceſſible, the want of perſpicuity or accurate arrangement, will be

ſuffer

compenſated by the merit of the diſquiſition, if it contains any. But if the eye of candour diſcerns no beauties in the work, to counterballance its numerous faults, it is the Author's fervent wiſh, that the waters of Lethe may ſoon waſh it from remembrance, and the veil of oblivion be drawn over it forever.

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FINIS.